

**PATENT APPLICATION**  
**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**  
**BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

In re application of

Docket No: Q77694

Masayoshi SAWAI

Appln. No.: 10/669,644

Group Art Unit: 2123

Confirmation No.: 4448

Examiner: Mary JACOB

Filed: September 25, 2003

For: METHOD OF ASSISTING WIRING DESIGN OF WIRING STRUCTURE, ITS  
APPARATUS AND ITS PROGRAM

**RESPONSE TO NOTICE OF NON-COMPLIANT APPEAL BRIEF**

**UNDER 37 C.F.R. § 41.37**

**MAIL STOP APPEAL BRIEF - PATENTS**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

Appellant submits herewith a Response to the Notification of Non-Compliant Appeal Brief dated October 26, 2007. A revised version of only the Summary of the Claimed Subject Matter has been submitted, as requested in the Notification. The page numbers in the revised Summary Section are same as in the originally filed Appeal Brief.

RESPONSE TO NOTICE OF NON-COMPLIANT  
APPEAL BRIEF UNDER 37 C.F.R. § 41.37  
U.S. Patent Application No.: 10/669,644

Attorney Docket No.: Q77694

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

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Date: November 26, 2007

**V. SUMMARY OF THE CLAIMED SUBJECT MATTER**

The present invention relates to a method of assisting a wiring design of a wiring structure. According to the present invention, an optimum wiring design for a wire harness can be obtained. In prior art designs, the design and integration of the wiring harness is carried out by trial and error method and as such a high degree of skill is required. Further, resonance can occur in the wiring harness due to vibrations imparted to the harness by the engine or other parts of a vehicle to which the wiring harness is tied. The present invention provides for calculating a natural frequency and a natural vibration mode for a specific wiring harness design so that the parameters input for coming up with the specific wiring harness design can be tweaked in order to avoid resonance. Thereby, an accurate wiring harness design can be obtained that can be integrated with a vehicle, etc.

The present invention as recited in claim 1 is directed to a method of assisting a wiring design of a wiring structure (Summary of the Invention at page 2 lines 16-25 and Fig. 8). The method comprises regarding the wiring structure constituted by a plurality of pieces of line streak members as an elastic body having a circular section, the elastic body having a plurality of beam elements coupled with each other, a linearity of the plurality of beam elements being maintained (Fig. 1 and page 12 lines 14-22). The method further comprises applying information concerning a shape characteristic (Fig. 3B, page 13 lines 23-24), a material characteristic (paragraph bridging pages 13 and 14) and a constraining condition of the wiring structure as a predetermined condition to a finite element method (Fig. 2, 8, page 27 lines 8-24). Once the above information is applied, the method continues as calculating a predicted shape of a

displaced wiring structure such that the predetermined condition is satisfied (paragraph bridging pages 28 and 29, and paragraph bridging pages 29 and 30). The method also includes further calculating a characteristic value with respect to vibration for the calculated predicted shape (item S3 Fig. 8, page 30 lines 10-14); and outputting the calculated predicted shape and the calculated characteristic value (item S4 Fig. 8).

The present invention as recited in claim 4 also provides for a method of assisting a wiring design of a wiring structure by calculating a predicted shape concerning a wiring structure constituted by a plurality of pieces of line streak members (Summary of the Invention at page 2 lines 16-25 and Fig. 1, 9B). The method includes analyzing a characteristic value with respect to vibration for the predicted shape (item S3 Fig. 8, page 30 lines 10-14); and outputting a result of the analysis (item S4 Fig. 8).

The present invention as recited in claim 7 also provides for an apparatus (Fig. 7) for assisting a wiring design of a wiring structure in which the wiring structure constituted by a plurality of pieces of line streak members (Fig. 1) is regarded as an elastic body having a circular section, the elastic body having a plurality of beam elements coupled with each other, a linearity of the plurality of beam elements being maintained (Fig. 1 and page 12 lines 14-22), and a shape of the wiring structure which satisfies a predetermined condition is predicted by utilizing a finite element method (item S2 Fig. 8), the apparatus comprising a setting unit for setting information concerning a shape characteristic, a material characteristic and a constraining condition of the wiring structure as the predetermined condition (item S1 Fig. 8). The apparatus further includes a predicted shape calculating unit for calculating a predicted shape of a displaced wiring structure such that the condition is satisfied by applying the predetermined condition to the finite

element method (paragraph bridging pages 28 and 29, and paragraph bridging pages 29 and 30).

The apparatus further includes a natural vibration mode calculating unit for calculating a natural vibration mode with respect to the predicted shape calculated by the predicted shape calculating unit (page 30 lines 10-15), and an outputting unit for outputting the calculated predicted shape and the calculated natural vibration mode (item 23 Fig. 7, page 26 lines 13-16).

The present invention as recited in claim 5 also provides for an apparatus (Fig. 7) for assisting a wiring design of a wiring structure in which the wiring structure constituted by a plurality of pieces of line streak members (Fig. 1) is regarded as an elastic body having a circular section, the elastic body having a plurality of beam elements coupled with each other, a linearity of the plurality of beam elements being maintained (Fig. 1 and page 12 lines 14-22), and a shape of the wiring structure which satisfies a predetermined condition is predicted by utilizing a finite element method (item S2 Fig. 8), the apparatus comprising a setting unit for setting information concerning a shape characteristic, a material characteristic and a constraining condition of the wiring structure as the predetermined condition (item S1 Fig. 8). The apparatus further includes a predicted shape calculating unit for calculating a predicted shape of a displaced wiring structure such that the condition is satisfied by applying the predetermined condition to the finite element method (paragraph bridging pages 28 and 29, and paragraph bridging pages 29 and 30). The apparatus also includes a natural frequency calculating unit for calculating a natural frequency with respect to the predicted shape calculated by the predicted shape calculating unit (page 30 lines 10-15), and a first outputting unit for outputting the calculated predicted shape and the calculated natural frequency (item 23 Fig. 7, page 26 lines 13-16).

The present invention as recited in claim 8 also provides for a recording medium (item 29 Fig. 7) storing a program (item 29a Fig. 7) which causes a computer to function as an apparatus of assisting wiring design of a wiring structure. The description for the remaining features of claim 8 is the same as the description for the same features given for claim 5. an apparatus (Fig. 7) for assisting a wiring design of a wiring structure in which the wiring structure constituted by a plurality of pieces of line streak members (Fig. 1) is regarded as an elastic body having a circular section, the elastic body having a plurality of beam elements coupled with each other, a linearity of the plurality of beam elements being maintained (Fig. 1 and page 12 lines 14-22), and a shape of the wiring structure which satisfies a predetermined condition is predicted by utilizing a finite element method (item S2 Fig. 8), the apparatus comprising a setting unit for setting information concerning a shape characteristic, a material characteristic and a constraining condition of the wiring structure as the predetermined condition (item S1 Fig. 8). The apparatus further includes a predicted shape calculating unit for calculating a predicted shape of a displaced wiring structure such that the condition is satisfied by applying the predetermined condition to the finite element method (paragraph bridging pages 28 and 29, and paragraph bridging pages 29 and 30). The apparatus also includes a natural frequency calculating unit for calculating a natural frequency with respect to the predicted shape calculated by the predicted shape calculating unit (page 30 lines 10-15), and a first outputting unit for outputting the calculated predicted shape and the calculated natural frequency (item 23 Fig. 7, page 26 lines 13-16).